WORKTABLE ELEVATING DEVICE FOR A PLANER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a worktable-elevating device for the planing table of a planer, particularly to one able to move the worktable up and down with quickness.

2. Description of the Prior Art

A conventional planer usually has its worktable moved up and down by manually turning around a hand wheel, wasting labor and time and unable to quickly elevate a planing table. Another conventional planer is provided with an electrically elevating device to drive a planing table to move up and down, having complicated structure and increasing producing cost.

SUMMARY OF THE INVENTION

The objective of this invention is to offer a worktable-elevating device for a planer, able to quickly move the worktable up and down by pulling a control rod and automatically actuate the worktable to atop moving by releasing the control rod.

BRIEF DESCRIPTION OF DRAWINGS

This invention will be better understood by referring to the accompanying drawings, wherein:

Fig. 1 is a perspective view of a planer in the present invention:

Fig. 2 is a perspective view of the worktable-elevating device for a planer in the present invention:

Fig. 3 is an exploded perspective view of the worktable-elevating device for a planer in the present invention:

Fig. 4 is a side perspective view of the worktable-elevating device for a planer in the present invention:

Fig. 5 is a cross-sectional view of the worktable-elevating device for a planer in the present invention:

Fig. 6 is a front view of the worktable-elevating device for a planer in the present invention:

Fig. 7 is a perspective view of the worktable-elevating device for a planer in the present invention, showing a control rod pulled upward:

Fig. 8 is a front view of the worktable-elevating device for a planer in the present invention, showing the control rod pulled upward:

Fig. 9 is a perspective view of the worktable-elevating device for a planer in the present invention, showing the control rod pulled downward: and

Fig. 10 is a front view of the worktable-elevating device for the planing table of a planer in the present invention, showing the control rod pulled downward.

DETAILED DESCRIPTION OF THE PREFERRED

EMBODIMENT

A preferred embodiment of a worktable elevating device for a planer in the present invention, as shown in Figs. 1, 2 and 3, is combined with a bottom base 10, a planing table 20 of a planer.

The bottom base 10 has its four corners respectively fixed with a guide column 11 and has a worm 12 secured at a preset location on one side.

The worktable 20 is slidably fitted on the four guide columns 11 of the bottom base 10 and threadably assembled with the worm 12 of the bottom base 10, able to be moved up and down. The worktable 20 is provided with an actuating shaft 21 on a preset side, a knife shaft 22 for planing and a motor 23 for driving the actuating shaft 21 and the knife shaft 20. The actuating shaft 21 is provided with an actuating chain wheel 24 having an endless chain 25 engaged thereon.

The worktable-elevating device 30, as shown in Figs. 3, 4 and 5, includes a base body 31, an input gear unit 32, two output gear unit 33, a worm holder 34, a control rod 35 and two elastic compressing units 36. The base body 31 contains a vertical bearing holding plate 311 having two pivotal lugs 312 respectively extending outward at its opposite lower sides to be fixed on the topside wall 26 of the worktable 20 by bolts 313. The vertical bearing holding plate 311 is provided in the center with a shaft hole 3111 having its inner side bored

with a recessed bearing position groove 3112 with a comparatively large diameter. Besides, the vertical bearing holding plate 311 has its upper and lower end respectively extending outward to form a horizontal bearing holding plate 314. Each horizontal bearing holding plate 314 is bored in the center with a shaft hole 3141 having its inner side formed with a recessed bearing groove 3142 with a comparatively large diameter. A plate cover 315 to be fixed on the free end wall of the two horizontal bearing holding plates 314 has one side provided at a preset position with an upper and a lower pivotal member 3151 extending horizontally toward the base body 31.

The input gear unit 32 consists of a bearing 321, a transmission shaft 323 and a bevel gear 326. The bearing 321 is positioned in the bearing groove 3112 of the vertical bearing holding plate 311 of the base body 31 by a C-shaped lock washer 322. The transmission shaft 323 is pivotally inserted through the bearing 321 and has one end extending out of the shaft hole 3111 of the vertical bearing holding plate 311 and having a driven chain wheel 325 fixed thereon by a C-shaped lock washer 324, with the drive chain wheel 325 driven to rotate together with the actuating chain wheel 24 of the worktable 20 by means of the endless chain 25, which meshes with the two chain wheels 24 and 325. The bevel gear 326 has its central shaft hole 3261 fitted with the transmission shaft

323 at the inner side of the base body 31 and secured thereon by a C-shaped lock washer 327, letting the bevel gear 326 actuated to rotate with the transmission shaft 323.

The two output gear units 33 are respectively assembled on the upper and the lower horizontal bearing holding plate 314 of the base body 31. Each output gear unit 33 is composed of a bearing 331 and a bevel gear 333. The bearing 331 is positioned in the bearing position groove 3142 of the horizontal bearing holding plate 314 by a C-shaped lock washer 332. The bevel gear 333 is bored with a central shaft hole 3331 to be fitted around the worm 12 of the bottom base 10, with a proper gap formed between the shaft hole 3331 and the worm 12. A shaft tube 3332 extends outward from one side of the shaft hole 3331 of the bevel gear 333 to be pivotally inserted through the bearing 331. In addition, the two bevel gears 333 of the two output gear units 33 and the bevel gear 326 of the input gear unit 32 respectively have their rotation axes intercrossing at 90 degrees so that they can be meshed with each other and driven to rotate reversely. Further, each bevel gear 333 of the two output gear units 33 has the other side, opposite to the shaft tube 3332, annularly provided with four projecting block-shaped engaging teeth 3333.

The worm holder 34 is screwed with the worm 12 between the two output gear units 33 and separated from

the two bevel gears 333 at a proper distance. The worm holder 34 is bored with a center threaded hole 341 in the center to be screwed with the worm 12 and has its intermediate outer edge formed with two annular flanges 342 extending outward horizontally, with an annular position groove 343 formed between the two annular walls 342. Further, the worm holder 34 has its upper and lower side respectively provided with four projecting block-shaped engaging teeth 344 to mesh with the block-shaped engaging teeth 3333 of the two bevel gears 333 of the two output gear units 33.

The control rod 35 shaped as an elongate plate has one end pivotally assembled at an intermediate position of one side of the plate cover 315, opposite to the pivotal members 3151, and has a position stud 351 fixed at a preset position near its pivotal fulcrum to be inserted in the annular position groove 343 of the worm holder 34. Thus, when the control rod 35 is pulled upward or downward, the position stud 351 will actuate the worm holder 34 to move up or down to engage with one of the two output gear units 33.

The two elastic compressing units 36 respectively consists of a compressing bolt 361, a compression spring 362 and two locking nuts 363. The pressing bolt 361 is fitted around by the compressing spring 362 and vertically inserted through the pivotal member 3151 of the plate cover 315 to be fixedly positioned thereon by

the two locking nuts 363. Thus, two heads 3611 of the two pressing bolts 361 can elastically compress a preset portion of the control rod 35 so as to enable the control rod 35 to automatically recover its original position by the elastic compressing unit 36 after the control rod 35 is pulled upward or downward and then released.

When the worktable elevating device 30 is in a motionless condition, as shown in Fig. 6, the force applying end of the control rod 35 is compressed by the two elastic pressing units 36 and positioned horizontally, thus forming a certain gap between the engaging teeth 344 of the worm holder 34 and the engaging teeth 3333 of the two bevel gears 333 of the two output gear units 33, with the worm holder 34 not driven to rotate.

In operating and using, as shown in Figs. 7 and 8, when pulled upward with its pivotal fulcrum serving as a rotating shaft, the control rod 35 will be turned upward and its position stud 351 inserted in the annular position groove 343 of the worm holder 34 will simultaneously move the worm holder 34 upward to let the engaging teeth 344 on the topside of the worm holder 34 meshing with the engaging teeth 3333 on the bottom side of the bevel gear 333 of the upper output gear unit 33. At this time, the upper output gear unit 33 will drive the worm holder 34 to rotate together in the same direction and move the worktable 20 upward quickly because of the worm holder 34 engaging with the worm 12. Additionally,

when the force-applying end of the control rod 35 is pulled upward, it will push against the pressing bolt 361 of the upper elastic compressing unit 36 and compress the compression spring 362. Therefore, when the worktable 20 is moved to a needed position and the control rod 35 is released, the force applying end of the control rod 35 will recover its originally horizontal position by the recovering resilience of the compression spring 362, and the worm holder 34 will disengage from the upper output gear unit 33 to let the worktable 20 automatically stop moving up and down.

On the contrary, as shown in Figs. 9 and 10, when the control rod 35 is pulled downward, the worm holder 34 will be moved downward and meshed with the lower output gear unit 33 to be actuated to rotate together with the lower output gear unit 33 in the same direction and move the worktable 20 downward quickly. When the worktable 20 is adjusted to a needed position and the control rod 30 is released, the force-applying end of the control rod 30 will automatically recover its original position by the recovering resilience of the compression spring 362 and the worktable 20 will stop moving up and down.

Evidently, the worktable 20 can easily and quickly be moved up or down only by pulling the control rod 35 upward or downward and can be stopped moving up or down by releasing the control rod 35 to let it

automatically recover its original position by the recovering resilience of the two elastic pressing units 36, easy in handling and practical worth and industrial profitability.

In addition, a backlash of a preset size between the worm holder 34 of the elevating device 30 and the worm 12 of the bottom base 10 can be set in advance, and the size of this backlash is approximately equivalent to the total of two engaging gaps formed between the worm holder 34 and the two output gear units 33. Thus, when the control rod 35 actuates the worm holder 34 to move upward or downward, the backlash or the engaging gap enables the worm holder 34 to be moved up and down, and when the backlash or the engaging gap is eliminated, the worm holder 34 can closely and smoothly be engaged with the worm 12 or the output gear unit 33.

While the preferred embodiment of the invention has been described above, it will be recognized and understood that various modifications may be made therein and the appended claims are intended to cover all such modifications that may fall within the spirit and scope of the invention.

I CLAIM